

76 - Intraspecific variation in the response of bean (*Phaseolus vulgaris* L.) and soybean (*Glycine max* L.) genotypes to elevated CO₂ in an indoor farming environment.

Jose, Soares¹, Teresa, Deuchande¹, Manuela, Pintado¹, Marta, Vasconcelos¹.

1 - CBQF-ESB/UCP

Presenting author: José Soares ✉ josesoares4@hotmail.com

The consequence of elevated carbon dioxide (eCO₂) on plant responses is an important topic and has been the subject of several scientific research.

This study was conducted to determine the effect of eCO₂ on 18 bean and soybean genotypes. They were grown at indoor controlled-environment chambers under eCO₂ of 800 ppm and ambient CO₂ of 400 ppm conditions. Our results showed that in general there was a large variability of response within cultivars and between species. Across all genotypes, the percent change at eCO₂ ranged from -67 to +50% in pods per plant, -6 to +42% for leaf chlorophyll concentrations, -67 to +70% for seeds per plant, -35 to +85% for 100-seed weight, -72 to +35% in grain yield, -70 to +30% in aboveground dry weight and -32 to +16% in height for soybean genotypes.

In terms of minerals content, the [Zn] ranged from -17 to +20%, [Mn] from -53 to +44%, [Fe] from -29 to +13%, [P] from -31% to +43, [Mg] from -1 to +40%, [Ca] from -26 to +69%, and [K] from -12 to +15% percent change at eCO₂ for soybean genotypes.

Regarding bean, the percent change at eCO₂ ranged from -46 to +80% in terms of pods per plant, the non-destructive measurement of leaf chlorophyll concentrations varied from -27 to +21%, the seeds per plant from -46 to +81%, the 100-seed weight from -46 to +4%, -64 to +42% in terms of grain yield, -32 to +50% for aboveground dry weight, and from -21 to +49% for height. For bean, the [Zn] ranged from -23 to +10%, [Mn] from -47 to +26%, [Fe] from -30 to +22%, [P] from -12% to +14, [Mg] from -12 to +14%, [Ca] from -21 to +36%, and [K] from -22 to +16%. Seed nitrogen concentration also ranged from -5 to +11% and -10 to +9% for bean and soybean genotypes, respectively. Our results provide significant intraspecific differences among individuals from both species tested in terms of CO₂ enrichment and show that there is enough cultivar variability to select cultivars with better performance.